

NOVEMBER/DECEMBER 2024

**GCH32/DCH32 — INORGANIC
CHEMISTRY – III**

Time : Three hours

Maximum : 75 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL the questions.

1. Define hapticity using an example.
2. What is meant by oxidative addition?
3. Write the advantages of polymer bound catalysts.
4. Give the structure of Reppe's Catalyst.
5. How do you define atom transfer reactions using an example?
6. What are bridging ligands? Give an example.
7. How do ligand substitution reaction occurs in square planar complexes?
8. What do you understand from Trans effect?
9. Give an example for photoredox reactions.
10. Write a short note on the role of metal complexes in solar energy conversion.

SECTION B — ($5 \times 5 = 25$ marks)

Answer ALL questions.

11. (a) Outline the structure and bonding characteristics of metal nitrosyls.

Or

- (b) Write note on ligand protonation in organometallic compounds.

12. (a) Discuss in detail the mechanism of olefin hydroformylation (Oxo) process.

Or

- (b) Discuss the importance of polymer bound catalysts with example.

13. (a) Explain briefly the mechanisms of inner sphere and outersphere complexes.

Or

- (b) Discuss the role of bridging ligand in complexes.

14. (a) How is trans-effect employed for distinguishing between cis and trans isomers of $[\text{Pt A}_2 \text{X}_2]$ type complexes?

Or

- (b) Discuss about the influences of entering, leaving and other groups in substitution reaction.

15. (a) Discuss briefly the substitution reaction of cobalt octahedral complexes.

Or

- (b) Write a note on photo substitution reactions.

SECTION C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

16. Describe the synthesis, structure and bonding of ferrocene.

17. Explain the following process :

(a) Zeigler-Natta Catalyst

(b) Wilkinson's Catalyst.

18. How are successor and precursor complexes formed? Explain briefly with suitable examples.

19. Describe the substitution reactions of square-planar complexes with suitable examples.

20. Explain the photo-sensitisation reactions of $[\text{Ru}(\text{bpy})_3]^{2+}$ complex and give its application in solar energy conversion.